

# **AEROSPACE MEDICINE AND BIOLOGY**

A CONTINUING BIBLIOGRAPHY WITH INDEXES

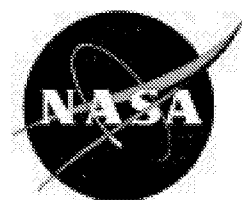
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In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

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# Typical Report Citation and Abstract

- ❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
- ❷ Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

## Key

1. Document ID Number; Corporate Source
2. Title
3. Author(s) and Affiliation(s)
4. Publication Date
5. Contract/Grant Number(s)
6. Report Number(s); Availability and Price Codes
7. Abstract
8. Abstract Author
9. Subject Terms

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# AEROSPACE MEDICINE AND BIOLOGY

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*A Continuing Bibliography (Suppl. 493)*

JUNE 14, 1999

## 51

### LIFE SCIENCES (GENERAL)

19990038350 National Academy of Sciences - National Research Council, Washington, DC USA

Institute of Laboratory Animal Research (ILAR) *Annual Report, 1 Apr. 1998 - 31 Mar. 1999*

Dell, Ralph; Mar. 1999; 13p; In English

Contract(s)/Grant(s): DAMD17-98-1-8275

Report No.(s): AD-A361548; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Institute for Laboratory Animal Research (ILAR) is a component of the Commission on Life sciences (CLS), National Research Council (NRC). Partial support for ILAR has been provided for many years from the Department of the Army to enable ILAR to fulfill its mission. Founded in 1952, ILAR has become recognized nationally and internationally as a leader in developing and making available to the biomedical and laboratory animal science communities guidelines for animal care, breeding, and use; descriptions of animal models for human diseases and physiological processes; and reports on specific issues of humane care and use of laboratory animals. ILAR's mission is to help improve the availability, quality, care, and humane and scientifically valid use of laboratory animals. ILAR accomplishes its goals through its core program, which is carried out by the staff and its special-project program, which is carried out by NRC-appointed committees with staff assistance. The number of committees and size of the staff are dependent on the number of special projects and available funding. Both programs are directed by a 14-member Council comprised of experts in laboratory animal medicine, zoology, genetics, medicine, ethics, and related biomedical sciences. The Army funds partially support general office operations, the Animal Models and Genetic Stocks Information Program, publication of ILAR Journal, and work of the Council.

DTIC

*Life Sciences; Animals; Breeding (Reproduction); Diseases; Medical Science; Information Theory; Laboratories*

19990040270 Pennsylvania Univ., Center for Bioactive Materials and Tissue Engineering, Philadelphia, PA USA

Reactions and Surface Transformations of a Bone-Bioactive Material in a Simulated Microgravity Environment

Radin, S., Pennsylvania Univ., USA; Ducheyne, P., Pennsylvania Univ., USA; Ayyaswamy, P. S., Pennsylvania Univ., USA; NASA Microgravity Materials Science Conference; February 1999, pp. 163-167; In English; See also 19990040241

Contract(s)/Grant(s): NAG8-1483; No Copyright; Avail: CASI; A01, Hardcopy; A06, Microfiche

A comprehensive program to investigate the expeditious in vitro formation of three-dimensional bone-like tissue is currently underway at the University of Pennsylvania. The study reported here forms a part of that program. Three-dimensional bone-like tissue structures may be grown under the simulated microgravity conditions of NASA designed Rotating Wall Bioreactor Vessels (RWV's). Such tissue growth will have wide clinical applications. In addition, an understanding of the fundamental changes that occur to bone cells under simulated microgravity would yield important information that will help in preventing or minimizing astronaut bone loss, a major health issue with travel or stay in space over long periods of time. The growth of three-dimensional bone-like tissue structures in RWV's is facilitated by the use of microcarriers which provide structural support. If the microcarrier material additionally promotes bone cell growth, then it is particularly advantageous to employ such microcarriers. We have found that reactive, bone-bioactive glass (BBG) is an attractive candidate for use as microcarrier material. Specifically, it has been found that BBG containing Ca- and P- oxides upregulates osteoprogenitor cells to osteoblasts. This effect on cells is preceded by BBG reactions in solution which result in the formation of a Ca-P surface layer. This surface further transforms to a bone-like mineral (i.e., carbonated crystalline hydroxyapatite (c-HA)). At normal gravity, time-dependent, immersion-induced BBG reactions and transformations are greatly affected both by variations in the composition of the milieu in which the glass is immersed and on the immersion conditions. However, the nature of BBG reactions and phase transformations under the simulated microgravity conditions of RWV's are unknown, and must be understood in order to successfully use BBG as microcarrier material in RWV'S. In

this paper, we report some of our recent findings in this regard using experimental and numerical methods. BBG composition 45S5, the most reactive among known bone-bioactive glasses, was chosen for the study. BBG 45S5 behavior in physiological solutions was tested in simulated microgravity and compared with that at normal gravity. On the basis of our numerical study, we have chosen the BBG granule size to be in the range 40-70 microns, and a RWV rotational speed of 10 rpm. Our numerical study has shown that these parameters enable the microcarrier to remain suspended in the medium without experiencing collisions with the wall of the vessel. Immersion-induced changes in the solution composition and the material surface were analyzed after immersion.

Derived from text

*Microgravity; Gravitational Effects; Space Environment Simulation; Tissues (Biology); Bones; Cells (Biology); Phase Transformations*

19990040425 Search for Extraterrestrial Intelligence Inst., Moffett Field, CA USA

**Energy from Redox Disproportionation of Sugar Carbon Drives Biotic and Abiotic Synthesis**

Weber, Arthur L., Search for Extraterrestrial Intelligence Inst., USA; Journal of Molecular Evolution; 1997; Volume 44, pp. 354-360; In English; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

To identify the energy source that drives the biosynthesis of amino acids, lipids, and nucleotides from glucose, we calculated the free energy change due to redox disproportionation of the substrate carbon of: (1) 26-carbon fermentation reactions and (2) the biosynthesis of amino acids and lipids of *E. coli* from glucose. The free energy (cal/mmol of carbon) of these reactions was plotted as a function of the degree of redox disproportionation of carbon (disproportionative electron transfers (mmol)/mmol of carbon). The zero intercept and proportionality between energy yield and degree of redox disproportionation exhibited by this plot demonstrate that redox disproportionation is the principal energy source of these redox reactions (slope of linear fit = -10.4 cal/mmol of disproportionative electron transfers). The energy and disproportionation values of *E. coli* amino acid and lipid biosynthesis from glucose lie near this linear curve fit with redox disproportionation accounting for 84% and 96% (and ATP only 6% and 1%) of the total energy of amino acid and lipid biosynthesis, respectively. These observations establish that redox disproportionation of carbon, and not ATP, is the primary energy source driving amino acid and lipid biosynthesis from glucose. In contrast, we found that nucleotide biosynthesis involves very little redox disproportionation, and consequently depends almost entirely on ATP for energy. The function of sugar redox disproportionation as the major source of free energy for the biosynthesis of amino acids and lipids suggests that sugar disproportionation played a central role in the origin of metabolism, and probably the origin of life.

Author

*Oxidation-Reduction Reactions; Synthesis (Chemistry); Biosynthesis; Sugars; Glucose; Free Energy; Amino Acids; Adenosine Triphosphate*

19990040822 Columbia Univ., Coll. of Physicians and Surgeons, New York, NY USA

**Development of the Fish Medaka in Microgravity *Final Report***

Wolgemuth, Debra J., Columbia Univ., USA; [1995]; 14p; In English

Contract(s)/Grant(s): NAG2-987; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of these experiments was to determine the effect of microgravity on the early development of the fish medaka. There were two objectives for this flight series. The primary objective was to assess the effects of microgravity on different stages of development and to ascertain whether the relevant developmental questions can be addressed at the gross morphological level or if the issues involve more subtle questions about regulation at the molecular and cellular levels. The secondary objective was the assessment of the utility of flight hardware with the capabilities to perform embryological studies. We have been able to take advantage of the flight testing phase of the STL-B hardware to also study the effects of microgravity on the early development of the fish, Medaka. Our initial studies involved monitoring the early Medaka development and raising flight embryos for breeding. Images of the developing embryos were collected either via video which was either taken by the astronauts or broadcast to Earth. Sample video images were digitized and stored on a hard drive resident within the on-board STL-B unit. Embryos were fixed at specific intervals, returned to Earth and are being analyzed for the timing and location of molecular events associated with controlling the morphological pattern for the onset of adult structures.

Author

*Breeding (Reproduction); Fishes; Microgravity; Spaceborne Experiments*



**52**  
**AEROSPACE MEDICINE**

*Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.*

19990038349 Louisiana State Univ., Pennington Biomedical Research Center, Baton Rouge, LA USA  
Determination of Total Daily Energy Requirements and Activity Patterns of Service Women *Annual Report, 26 Sep. 1997 - 25 Sep. 1998*

Delany, James P.; Oct. 1998; 28p; In English

Contract(s)/Grant(s): DAMD17-96-2-6025

Report No.(s): AD-A361586; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of the current study is to define a range of energy requirements of service women, defining the variation as it relates to jobs, military settings, and activity patterns. This is crucial information needed not only for determination of nutritional requirements for energy balance, but specific nutrient density standards for servicewomen. Total daily energy expenditure is measured using the doubly labeled water (DLW) method. Activity patterns from actigraphs will be analyzed for hours of sleep, description of job/work patterns by examining bursts of concerted activity versus steady activity. Men will also be studied in these settings. Energy requirements' for men have been better established and will serve to anchor the results obtained in women to previously established norms in men. Several field studies will be conducted over the course of the grant. The first field study was conducted at Fort Bragg/Camp Mckall during a Combat Support Hospital training exercise. Energy expenditures were moderate, and higher in men than women. However, when adjusting for differences in body size, energy expenditures were similar.

DTIC

*Nutrition; Balance; Nutritional Requirements; Physical Exercise; Energy Budgets; Fatigue (Biology); Human Tolerances*

19990040418 Aerospace Corp., Technology Operations, El Segundo, CA USA  
A Survey of the Potential Effects of Increasing UV-B Radiation on the Biosphere. Revision

Martin, L. R.; Sep. 30, 1998; 38p; In English

Contract(s)/Grant(s): F04701-93-C-0094

Report No.(s): AD-A361283; TR-98(1306)-6; SMC-TR-99-08; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

There are by now well-established connections between the introduction of chlorine-containing molecules into the stratosphere, a consequent decrease in the concentration of stratospheric ozone, and an increase in UV-B radiation at the surface of the Earth. An increase in UV-B on average would increase the incidence rate of non-melanoma skin cancer worldwide, with an unproved but likely increase in melanoma skin cancer. Other effects on humans could include cataracts and immune system inhibition, but these are less well established. The response of domestic and wild animal populations to UV-B is not thought to be a serious problem at this time, in part because they are protected by fur. The response of plants is complex because plants exist in a highly competitive situation with other plants for water and light, and must survive in an environment of pests and diseases, which may also be affected by UV-B. The oceanic phytoplankton are the basis of the ocean food chain and are responsible for half of the natural carbon dioxide fixation. Studies have indicated that the phytoplankton are adversely affected by UV-B, and thus there is a potential for excess UV-B to affect fishing yields and the amount of carbon dioxide in the atmosphere.

DTIC

*Cancer; Ozone Depletion; Ultraviolet Radiation; Atmospheric Composition; Ozone*

19990040686 NASA Langley Research Center, Hampton, VA USA  
Aerospace Medicine and Biology: A Continuing Bibliography With Indexes, Supplement 491

May 17, 1999; 22p; In English

Report No.(s): NASA/SP-1999-7011/SUPPL491; NAS 1.21:7011/SUPPL491; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report lists reports, articles and other documents recently announced in the NASA STI Database.

Author

*Aerospace Medicine; Bibliographies*

19990040936 Aeromedical Inst., Soesterberg, Netherlands  
Degenerative Changes of the Spine in Pilots of the RNLAF *Final Report Degeneratieve Veranderingen in de Wervelkolom bij F-16 Vliegers*

Hendriksen, I. J. M., Aeromedical Inst., Netherlands; Holewijn, M., Aeromedical Inst., Netherlands; Mar. 1998; 32p; In English  
Contract(s)/Grant(s): A96/KLu/02

Report No.(s): Rept-1998-K2; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The aim of this study was to examine whether F-16 pilots are at an increased risk of(cervical) spine degeneration. Retrospectively, all pilots of the Royal Netherlands Air Force (RNLAf) that were systematically radiographed (at least twice) in the period between 1982 and 1994, were examined. In total 316 pilots were evaluated, 188 F-16 pilots (mean age 28.5 years at initial x-ray) and 128 pilots in the Control group (mean age 24.2 years at initial x-ray). The Control group consisted of 64 helicopter pilots, 63 NF-5 pilots and 1 F-27 Pilot. None of this group of pilots had more than 150 hours flying experience with an F-16. Two radiologists, who were blinded as to whether the x-ray films were of F-16 pilots or Control group, examined these x-rays separately. In both groups, the time between the two x-rays was on average 6 years. In these years the Control group had a significantly higher mean number of flying hours compared to the F-16 group (resp. 922 versus 690 hrs). Though the inter-rater agreement of the x-rays was rather low, both radiologists found comparable statistical significant differences between the two groups, on several levels of the cervical spine. In the F-16 group, an increased osteophytic spurring was found at levels C4-C5 and C6-C7, and increased arthrosis deformans was found in the cervical spine. Further analysis of the data of a selection of the total group of pilots, whereby the difference in age between both groups was minimized, showed that the higher mean age of the F-16 pilots was possibly correlated with the increased degeneration in this group. No consistent relationship was found between spinal degeneration and initial radiological status. Also, it appeared that increasing levels of spinal degeneration were not related to increasing flight hours. These findings suggest that frequent exposure to high + G(sub z) forces might cause premature degeneration of the spine in F-16 pilots. Future research has to demonstrate to what extent age, mission, and number of flying hours have influenced the results. An uniform international classification and coding system in combination with establishing an international data-base is recommended in order to more fully understand the relationship between exposure to high + G(sub z) forces and spinal degeneration.

Author

*Data Bases; Degeneration; Exposure; Radiology; Spine; X Rays; Pilots (Personnel); Research*

19990040967 Bionetics Corp., Cocoa Beach, FL USA

**Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence**

Hoffler, G. Wyckliffe, Editor, Bionetics Corp., USA; O'Donnell, Michele D., Editor, Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999; 254p; In English; 2nd; Benchmarking For Excellence, 24-28 Aug. 1998, Orlando, FL, USA; Sponsored by NASA Kennedy Space Center, USA; See also 19990040968 through 19990041018

Contract(s)/Grant(s): NAS10-12180; S-NAS10-001; RTOP 004-Y3

Report No.(s): NASA/CP-1999-208543; NAS 1.55:208543; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The theme of the 1998 NASA Occupational Health Conference was "Benchmarking for Excellence." Conference participants included NASA and contractor Occupational Health professionals, as well as speakers from NASA, other Federal agencies and private companies. Addressing the Conference theme, speakers described new concepts and techniques for corporate benchmarking. They also identified practices used by NASA, other Federal agencies, and by award winning programs in private industry. A two-part Professional Development Course on workplace toxicology and indoor air quality was conducted a day before the Conference. A program manager with the International Space Station Office provided an update on station activities and an expert delivered practical advice on both oral and written communications. A keynote address on the medical aspects of space walking by a retired NASA astronaut highlighted the Conference. Discipline breakout sessions, poster presentations, and a KSC tour complemented the Conference agenda.

Author

*Conferences; Health; Standardization; Safety Management; Personnel Management; Quality Control*

19990040968 Blair and Burke, College Station, TX USA

**Benchmarking: Workplace Trends and Current Issues in Occupational Health**

Blair, Brenda R., Blair and Burke, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 4-17; In English; See also 19990040967; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Occupational health services, like similar employer-provided services in the workplace, must assist in improving employee health and well being while at the same time enhancing productivity. This dual mission requires that Occupational Health Departments adopt continuous quality improvement systems just like any other function within the organization. It thus requires internal analysis, periodic benchmarking against other organizations, and constant monitoring of trends in the larger society which affect the delivery of occupational health services. The purpose of this paper is fourfold: (1) to present an overview of benchmarking, including definitions, objectives and methods; (2) to discuss trends in the workplace which affect the delivery of occupational

health services; (3) to identify trends in healthcare delivery in the US which affect the delivery of occupational health services; and (4) to identify and discuss trends in occupational health care in the US today.

Derived from text

*Medical Services; Public Health; Standards; Quality Control*

**19990040969** NASA Kennedy Space Center, Cocoa Beach, FL USA

**Results Oriented Benchmarking: The Evolution of Benchmarking at NASA from Competitive Comparisons to World Class Space Partnerships**

Bell, Michael A., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 20-23; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Informal benchmarking using personal or professional networks has taken place for many years at the Kennedy Space Center (KSC). The National Aeronautics and Space Administration (NASA) recognized early on, the need to formalize the benchmarking process for better utilization of resources and improved benchmarking performance. The need to compete in a faster, better, cheaper environment has been the catalyst for formalizing these efforts. A pioneering benchmarking consortium was chartered at KSC in January 1994. The consortium known as the Kennedy Benchmarking Clearinghouse (KBC), is a collaborative effort of NASA and all major KSC contractors. The charter of this consortium is to facilitate effective benchmarking, and leverage the resulting quality improvements across KSC. The KBC acts as a resource with experienced facilitators and a proven process. One of the initial actions of the KBC was to develop a holistic methodology for Center-wide benchmarking. This approach to Benchmarking integrates the best features of proven benchmarking models (i.e., Camp, Spendolini, Watson, and Balm). This cost-effective alternative to conventional Benchmarking approaches has provided a foundation for consistent benchmarking at KSC through the development of common terminology, tools, and techniques. Through these efforts a foundation and infrastructure has been built which allows short duration benchmarking studies yielding results gleaned from world class partners that can be readily implemented. The KBC has been recognized with the Silver Medal Award (in the applied research category) from the International Benchmarking Clearinghouse.

Derived from text

*Standardization; NASA Programs; Cost Effectiveness; Quality Control; Specifications*

**19990040970** Bionetics Corp., Occupational Health Program Support Office, Cocoa Beach, FL USA

**Benchmarking the Federal Agencies**

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 24-30; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The theme of benchmarking for this year's annual conference was selected almost one year ago. A group of excellent speakers was identified to discuss the process of benchmarking and describe some of the outstanding examples in corporate occupational health. The possibility was recognized that there might be excellent examples of occupational health services in the Federal sector. A meeting to discuss benchmarking Occupational Health Services in the Federal agencies was held early this year. Based on these discussions, a study was funded to identify the best practices and innovative approaches within other Federal agencies that provide employee health services. The study is intended to scope the investment in occupational health services in the Federal government and to recommend a benchmarking approach that can be used by the NASA centers as an ongoing program evaluation tool.

Derived from text

*Health; Medical Services; Standardization; Organizations*

**19990040971** American Airlines, Inc., AMR Corp., Fort Worth, TX USA

**Technological Advances in Travel Medicine**

McKenas, David K., American Airlines, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 31-39; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

It has been said that 100,000 people, the population of a moderate-sized city, travel in the skies over the domestic USA at any moment. Unlike a city, however, not much in the way of on-board emergency medical systems are available to them-that is, until recently. Many factors went into American's decision to greatly enhance on-board medical equipment on its fleet, and this paper will present that rationale. All major air carriers are following American's lead in these programs, and as a result, many

customer lives will be saved, and on-board passenger medical morbidity due to on-board illnesses and emergencies will be reduced.

Derived from text

*Medical Equipment; Medical Services; Emergency Life Sustaining Systems; Technology Assessment; Airline Operations*

19990040972 International SOS Assistance, Inc., International Healthcare Div., Indonesia

**International Travel Health Considerations**

Weston, Robert L., International SOS Assistance, Inc., Indonesia; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 40-43; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The paper summarizes the development and evolution of the travel medicine specialty (Emporiatrics). The major travel medicine problems (diarrhea, accident, illness, malaria), evolution of entry requirements, eradication programs, emergence and reemergence of infectious disease, special risks, preventive measures, political and environmental risks, stress of overseas duties, and the need for reliable resources and assistance are reviewed.

Derived from text

*Public Health; Travel; Sickesses; Diseases; Medical Services*

19990040975 Postal Service, Risk Management, Washington, DC USA

**U.S. Postal Service Safety and Risk Management Overview**

Jones, Jerry A., Postal Service, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 54-56; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Benchmarking study of Ferguson provided a large amount of information from other government agencies. Perhaps the most impressive and useful with regard to implementation of well-conceived programs was by the U. S. Postal Services. The manager of Risk Management for the U.S. Postal Services describes the health and safety services implemented for the 890,000 employees in more than 38,000 locations in the Postal Service and illustrates the magnitude of the undertaking. The salient features of the program are outlined and material that address programs, strategies and assessment of outcomes is presented.

Derived from text

*Risk; Standardization; Safety Management*

19990040976 MEDSTAT Group, Washington, DC USA

**Developing Normative and Benchmark Data For Health and Productivity Management: Results of a Multi-Employer Benchmarking Study**

Goetzel, Ron Z., MEDSTAT Group, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 57-64; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The following topics are discussed in the paper: (1) Developing a Model for Health and Productivity Management (HPM); (2) Results of the American Productivity and Quality Council (APQC)/MEDSTAT HPM Consortium Benchmarking Study; (3) Case Studies of Best Practice Organizations; and (4) Implications and Future Directions.

Derived from text

*Health; Productivity; Standardization; Management Methods*

19990040977 Johnson and Johnson, Inc., New Brunswick, NJ USA

**Johnson & Johnson Benchmarking for Excellence Corporate Health Achievement Award Winner**

Lemons, Susan L., Johnson and Johnson, Inc., USA; Isaac, Fikry W., Johnson and Johnson, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 67-72; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The Signature of Quality Program, the name given to the continuous improvement and Total Quality Management at Johnson & Johnson, is presented. The company's background as a diversified health care company is described. The credo of Johnson & Johnson, their definition of Benchmarking, three types of Benchmarking, process management, their code of conduct, and what is being offered in the market place is also presented.

Derived from text

*Health; Total Quality Management; Standardization; Industrial Management*

19990040978 Johnson and Johnson, Inc., New Brunswick, NJ USA

**An Integrated Shared Services Model**

Isaac, Fikry W., Johnson and Johnson, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 73-80; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Johnson & Johnson embarked on a study of their Health and Wellness services to benchmark similar programs and develop an improvement plan. The effort resulted in actions to integrate a number of related support services throughout the Corporation. The comprehensive employee health services, employee assistance programs and wellness programs were targeted for the reorganization. The resulting organization provides unified leadership standardized procedures including accountability, and cost assessments. Prevention and education were priorities in the new organization, but direct input into employee health benefits was an important part of the integrated services. The report describes the extensive service delivery model and provides details of the successful implementation of the integrated services plan.

Derived from text

*Medical Services; Health; Models; Support Systems*

19990040982 NASA Kennedy Space Center, Cocoa Beach, FL USA

**NASA Occupational Health Program FY98 Self-Assessment**

Brisbin, Steven G., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 96-97; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The NASA Functional Management Review process requires that each NASA Center conduct self-assessments of each functional area. Self-Assessments were completed in June 1998 and results were presented during this conference session. During FY 97 NASA Occupational Health Assessment Team activities, a decision was made to refine the NASA Self-Assessment Process. NASA Centers were involved in the ISO registration process at that time and wanted to use the management systems approach to evaluate their occupational health programs. This approach appeared to be more consistent with NASA's management philosophy and would likely confer status needed by Senior Agency Management for the program. During FY 98 the Agency Occupational Health Program Office developed a revised self-assessment methodology based on the Occupational Health and Safety Management System developed by the American Industrial Hygiene Association. This process was distributed to NASA Centers in March 1998 and completed in June 1998. The Center Self Assessment data will provide an essential baseline on the status of OHP management processes at NASA Centers. That baseline will be presented to Enterprise Associate Administrators and DASHO on September 22, 1998 and used as a basis for discussion during FY 99 visits to NASA Centers. The process surfaced several key management system elements warranting further support from the Lead Center. Input and feedback from NASA Centers will be essential to defining and refining future self assessment efforts.

Derived from text

*Industrial Safety; Safety Management; Health; Hygiene; NASA Programs*

19990040983 Bionetics Corp., Cocoa Beach, FL USA

**Occupational Health Program Performance Measures (Metrics)**

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 98-101; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Occupational Health Services are periodically re-justified to senior management. This process can best be accomplished by taking objective measurements of the services provided. There are three general categories of metrics, which are familiar, and are used formally, or informally to describe and justify services. They are: (1) Quality assurance metrics; (2) Productivity metrics; and (3) Outcome metrics. Patient satisfaction surveys and retrospective medical record audits help to measure quality and are important when used to reassure users of a concern for maintaining quality of local service. Both these types of metrics are important and should be thoughtfully collected for internal and local use. However, they are of very limited use in comparing services with those of other NASA Centers or Agencies. Counting the number of clinic visits and exams are measures of productivity and may be important when advocating for services locally. They may be presented as factors in justifying cost. Outcome measures often require a more intensive effort to collect and are more difficult to quantify, but they may be the most useful for our program management needs. Our challenge is to find a few performance measures that can be collected without extreme hardship on the

NASA Centers that are of significant use to demonstrate the value of providing Occupational Health Services and for comparing the effectiveness of those services with similar services in other Agencies.

Derived from text

*Health; NASA Programs; Productivity; Quality Control*

**19990040985** Bionetics Corp., Cocoa Beach, FL USA

**Physical Examination Nomenclature and Standardization**

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 105-108; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The purpose of this presentation is to introduce a draft document for consideration and review. The NASA Occupational Health Program proposes usage of the following categories and definitions of physical examinations. These include: (1) Pre-Placement; (2) Surveillance; (3) Job Certification; (4) Health Maintenance; and (5) Special Purpose. Also included in the report are tables of NASA's Physical Examination Matrices.

Derived from text

*Physical Examinations; Nomenclatures; Standardization*

**19990040986** NASA Kennedy Space Center, Cocoa Beach, FL USA

**Employee Assistance Program Issues**

Gettleman, Alan G., NASA Kennedy Space Center, USA; McGuire, William, Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 109; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

Employee Assistance Program (EAP) officers, as well as personnel in other disciplines from eight NASA Centers, attended this breakout session. Ms. Brenda Blair, MA, CEAP, a guest speaker at the conference, also attended as a consultant. Representatives from the NASA Centers introduced themselves and spoke briefly about their programs. In a discussion related to the conference theme on benchmarking, quality control issues within the EAP community and adequate documentation of cases were addressed. Disposition and provision for quality assurance checks for EAP providers in single person offices were also discussed. Ms. Blair presented methods for consulting with other NASA personnel in single person EAP offices as a quality control measure. EAP intervention in critical incidents was discussed. The question of whether EAP assistance is an asset or a potential liability in those situations was addressed. Suggestions were made of topics for future EAP video-conference topics. A program on EAP ethics was planned for a September video teleconference. Each person was asked to provide intake forms they use to Mr. Gettleman or Ms. Blair. Ms. Blair said she would review the forms to ensure that adequate notification is provided to the client for confidentiality. She would also review them to ensure they have adequate limits of confidentiality--a topic for future video teleconferencing. Mr. Gettleman described the NASA initiative to reduce stresses in the workplace, and the activities of an ad-hoc EAP group that will make recommendations to NASA senior management. Alternative training methods were discussed for reaching target audiences such as employees at risk, supervisors, and others. Pfc. David A. Pendleton, Victim Assistance Coordinator, U.S. Capitol Police. U.S. House of Representatives made a special presentation. Pfc. Pendleton was on duty during the tragic shooting of two Federal guards at the U.S. Capitol. He related the events immediately after the incident. He described the nature and structure of the EAP's and the separate nature of the House and Senate programs. This episode was a particularly difficult situation as large numbers of tourists were involved. William S. Barry, MD, the new Manager of the NASA Occupational Health Program Office was introduced to those attending the breakout session.

Derived from text

*Employee Relations; Personnel Management; Health; Personnel*

**19990040987** NASA Dryden Flight Research Center, Edwards, CA USA

**Benchmarking for Excellence and the Nursing Process**

Sleboda, Claire, NASA Dryden Flight Research Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 110-111; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Nursing is a service profession. The services provided are essential to life and welfare. Therefore, setting the benchmark for high quality care is fundamental. Exploring the definition of a benchmark value will help to determine a best practice approach.

A benchmark is the descriptive statement of a desired level of performance against which quality can be judged. It must be sufficiently well understood by managers and personnel in order that it may serve as a standard against which to measure value.

Derived from text

*Standardization; Medical Services; Quality Control*

19990040988 Bionetics Corp., Cocoa Beach, FL USA

**NASA Occupational Health Procedures and Guidelines on Health Services for International Travel or Assignment**

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 112-117; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

This NASA Occupational Health Procedures and Guidelines prescribes the responsibilities and procedures for safeguarding the health of NASA employees on international travel or assignment. The goal of the traveler health services is to prevent travel-related illness or mishap and promote effective management of health issues while on foreign travel. This document establishes the minimum traveler health program content. It is recognized that NASA Centers may have additional needs based on the specific number, composition, mission and destination of the traveling employees. This document should not limit NASA Centers from providing additional services in order to meet their unique requirements.

Derived from text

*NASA Programs; Health; Medical Services; Travel; Procedures*

19990040989 Bionetics Corp., Cocoa Beach, FL USA

**RehabWorks at the Kennedy Space Center**

Kirkland, Mary K., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 118-121; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The topics of the Certified Athletic Trainer, the "Industrial Athlete", On-site athletic training, the training facility at KSC, and the success of RehabWorks at KSC is presented. Results and cost savings as a result of the facility are discussed.

Derived from text

*Injuries; Personnel; Health; Physical Exercise*

19990040990 Bionetics Corp., Cocoa Beach, FL USA

**Health Risk Appraisal and Health Education Programs**

Ferguson, Emmett B., Jr., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 122-123; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An integral part of all NASA Center Occupational Health Programs should be an effective Health Education Program (HEP). An effective HEP should focus resources on preventing premature or disabling health problems in those employees at greatest risk of developing preventable health problems. Resources can be used most effectively and efficiently if they can be identified and offered intervention as early as possible. The Health Risk Appraisal (HRA) is a standardized instrument used to stratify risks for cardiovascular, cerebrovascular and behavior-related illness in a population. The HRA should be acceptable to the subject and the user. It should be simple, easy to complete and inexpensive.

Derived from text

*Health; Education; Risk*

19990040991 NASA Kennedy Space Center, Cocoa Beach, FL USA

**Kennedy Space Center Coronary Heart Disease Risk Screening Program**

Tipton, David A., NASA Kennedy Space Center, USA; Scarpa, Philip J., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 124; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The number one cause of death in the U.S. is coronary heart disease (CHD). It is probably a major cause of death and disability in the lives of employees at Kennedy Space Center (KSC) as well. The KSC Biomedical Office used a multifactorial mathematical formula from the Framingham Heart Study to calculate CHD risk probabilities for individuals in a segment of the KSC population that required medical evaluation for job certification. Those assessed to be high-risk probabilities will be targeted for intervention. Every year, several thousand KSC employees require medical evaluations for job related certifications. Most medical information for these evaluations is gathered on-site at one of the KSC or Cape Canaveral Air Station (CCAS) medical clinics. The formula

used in the Framingham Heart Study allows calculation of a person's probability of acquiring CHD within 10 years. The formula contains the following variables: Age, Diabetes, Smoking, Left Ventricular Hypertrophy, Blood Pressure (Systolic or Diastolic), Cholesterol, and HDL cholesterol. The formula is also gender specific. It was used to calculate the 10-year probabilities of CHD in KSC employees who required medical evaluations for job certifications during a one-year time frame. This KSC population was profiled and CHD risk reduction interventions could be targeted to those at high risk. Population risk could also be periodically reevaluated to determine the effectiveness of intervention. A 10-year CHD risk probability can be calculated for an individual quite easily while gathering routine medical information. An employee population's CHD risk probability can be profiled graphically revealing high risk segments of the population which can be targeted for risk reduction intervention. The small audience of NASA/contractor physicians, nurses and exercise/fitness professionals at the breakout session received the lecture very well. Approximately one third indicated by a show of hands that they would be interested in implementing a similar program at their NASA Center. Questions were asked pertaining to standardization for age, the validity of using the idealized male values also for the female population, and indications of the screening test's sensitivity and specificity.

Derived from text

*Medical Services; Risk; Personnel; Heart Diseases; Surveys; Clinical Medicine*

19990040992 NASA Kennedy Space Center, Cocoa Beach, FL USA

#### **Industrial Hygiene Issues**

Brisbin, Steven G., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 125-126; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

This breakout session is a traditional conference instrument used by the NASA industrial hygiene personnel as a method to convene personnel across the Agency with common interests. This particular session focused on two key topics, training systems and automation of industrial hygiene data. During the FY 98 NASA Occupational Health Benchmarking study, the training system under development by the U.S. Environmental Protection Agency (EPA) was deemed to represent a "best business practice." The EPA has invested extensively in the development of computer based training covering a broad range of safety, health and environmental topics. Currently, five compact disks have been developed covering the topics listed: Safety, Health and Environmental Management Training for Field Inspection Activities; EPA Basic Radiation Training Safety Course; The OSHA 600 Collateral Duty Safety and Health Course; and Key program topics in environmental compliance, health and safety. Mr. Chris Johnson presented an overview of the EPA compact disk-based training system and answered questions on its deployment and use across the EPA. This training system has also recently been broadly distributed across other Federal Agencies. The EPA training system is considered "public domain" and, as such, is available to NASA at no cost in its current form. Copies of the five CD set of training programs were distributed to each NASA Center represented in the breakout session. Mr. Brisbin requested that each NASA Center review the training materials and determine whether there is interest in using the materials as it is or requesting that EPA tailor the training modules to suit NASA's training program needs. The Safety, Health and Medical Services organization at Ames Research Center has completed automation of several key program areas. Mr. Patrick Hogan, Safety Program Manager for Ames Research Center, presented a demonstration of the automated systems, which are described by the following: (1) Safety, Health and Environmental Training. This system includes an assessment of training needs for every NASA Center organization, course descriptions, schedules and automated course scheduling, and presentation of training program metrics; (2) Safety and Health Inspection Information. This system documents the findings from each facility inspection, tracks abatement status on those findings and presents metrics on each department for senior management review; (3) Safety Performance Evaluation Profile. The survey system used by NASA to evaluate employee and supervisory perceptions of safety programs is automated in this system; and (4) Documentation Tracking System. Electronic archive and retrieval of all correspondence and technical reports generated by the Safety, Health and Medical Services Office are provided by this system.

Derived from text

*Health; Hygiene; Training Devices; Industrial Safety; Safety Management*

19990040993 Johnson Controls, Inc., Bay Saint Louis, MO USA

#### **SSC Environmental Health Project Program**

Breuer, Denise C., Johnson Controls, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 128-132; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Facility Operations and Support Services Contract Environmental Health Office provides Environmental Health service to all groups at Stennis Space Center. Over the past four years, we have grown from a staff of five to a staff of nine. We have gained three Environmental Engineers and an Environmental Health Specialist. In addition, our cost plus contract was converted to a



performance-based contract in August 1997. These factors coupled with an overall desire to operate more efficiently prompted us to improve our record keeping systems. Our intent is to demonstrate the capabilities and benefits of a customized automated information tracking system for Environmental Health data. We will present a demonstration of our Environmental Health Project (EHP) tracking program through the use of printed screen images with captions describing our documentation process. We will also provide a list of the benefits that we have derived from using this system.

Derived from text

*Project Management; Environmental Quality; Health; Information Systems*

19990040994 NASA Marshall Space Flight Center, Huntsville, AL USA

**MSFC Respiratory Protection Services**

CoVan, James P., NASA Marshall Space Flight Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 133-135; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An overview of the Marshall Space Flight Center Respiratory Protection program is provided in this poster display. Respiratory protection personnel, building, facilities, equipment, customers, maintenance and operational activities, and Dynatech fit testing details are described and illustrated.

Derived from text

*Respiratory System; Medical Equipment; Respirators; Health*

19990040996 University of South Florida, Saint Petersburg, FL USA

**Predicting Return to Work in Patients with Coronary Heart Disease**

Francois, Rony, University of South Florida, USA; David, Patricia, University of South Florida, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 139-143; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The prevalence of coronary heart disease in the USA is estimated at 13.49 million. It remains the leading cause of death, claiming 489,970 lives in 1993. The incidence of acute myocardial infarction is 1.5 million cases per year. Successful return to work by patients following a myocardial infarction (MI) could recuperate lost income, improve workplace productivity, and decrease the cost associated with cardiovascular disease. The ability to predict return to work would thus allow a more efficient use of increasingly limited resources. The purpose of this thesis was to design and test a new tool that physicians and others could use to more accurately assess the prospect of a person returning to work after a myocardial infarction. This new tool was based upon two previous scales (Jezer, 1959 and Schiller, 1971 ) and a literature review. to assess its validity, this scale was tested on 81 post-MI patients at the Bay Pines Veterans Hospital. They were surveyed by phone and/or had their charts reviewed. The patients were asked to answer 13 questions in the survey. The factors assessed included: age, current episodes of angina, working status at time of MI, educational level, perception of health, physical demands of their previous job, co-morbidity, disability/pension/social security benefits, sex, psychological status, cardiac rehabilitation participation, duration of angina, and current working status. For each factor, a numerical value of 0, 1, or 2, was assigned based on the patient's answer. These value changed for age (0, 1, 4) and sex (0, 2)). Each patient thus had a total score and was placed in one of four categories (I-IV). A 4x2 table was generated with two columns of working and non-working individuals. Four rows depicted categories I to IV. Each cell contained the number of patients falling into that Category and working status. A Chi square test was conducted to determine whether the various Categories indeed predicted the patients' current working status. At a p value of .05, the Chi square of 42.60 was statistically significant and the null hypothesis that the categories were unrelated to return to work was rejected. A t-test was then conducted to compare the mean scores of patients presently working, versus those not currently working. At a p value of .05, and a critical t of 2.0, the obtained t value of 7.36 was statistically significant and the null hypothesis was again rejected. The 95% confidence interval was calculated to be 4.29 to 7.49. In other words, the total score of the patients who were not working was 4 to 7.5 points higher than those currently working. A regression analysis revealed that the full model of the predictive rating scale had an overall accuracy of 95.06%. A backward elimination procedure identified current angina, baseline employment status, co-morbidity, and benefits as the key predictors of successful return to work. A model based only on these variables was also 95.06% accurate in its predictive accuracy. This rating scale appears to be a valid tool in the prediction of return to work in patients with coronary heart disease. Testing of this scale on a larger sample of female and male patients will help establish its validity and assess its reliability.

Author

*Myocardial Infarction; Predictions; Productivity; Statistical Tests*

19990040999 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

**Lead Poisoning in a Construction Company: Science Effecting Policy**

Hales, Thomas R., National Inst. for Occupational Safety and Health, USA; McCammon, C., National Inst. for Occupational Safety and Health, USA; Daniels, W., National Inst. for Occupational Safety and Health, USA; Lee, S., National Inst. for Occupational Safety and Health, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 153-155; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

An estimated 1,000,000 construction workers are exposed to lead. Case studies and State occupational lead registries have documented the problem of lead poisoning in the construction industry. Despite this information, the construction industry has been exempt from the OSHA general industry lead standard, primarily due to economic and technical feasibility concerns. In 1991, a study of "lead burners" at a construction company in Utah was undertaken to determine: (1) Airborne lead exposures; (2) Whether adverse health effects were occurring among employees; and (3) Whether this company could implement provisions of the OSHA general industry lead standard.

Derived from text

*Lead Poisoning; Industrial Safety; Environment Pollution; Construction Industry; Feasibility Analysis*

19990041000 Kelsey Seybold, Huntsville, AL USA

**The Nurse Practitioner in NASA Occupational and Preventive Medicine Programs**

Kiessling, Janet, Kelsey Seybold, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 156-157; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The NASA Marshall Space Flight Center has implemented a cost-effective benchmark of excellence in the integration of a nurse practitioner into the Center's occupational and preventive medicine programs. This paper defines the position of nurse practitioner and describes the versatility, value added, and cost savings achievable by employing a nurse practitioner in NASA Center medical programs.

Derived from text

*Health; Cost Effectiveness; NASA Programs; Medical Services*

19990041003 NASA Lewis Research Center, Cleveland, OH USA

**Chemical Hygiene Program**

Mayor, Antoinette C., NASA Lewis Research Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 164; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

The Chemical Management Team is responsible for ensuring compliance with the OSHA Laboratory Standard. The program at Lewis Research Center (LeRC) evolved over many years to include training, developing Standard Operating Procedures (SOPs) for each laboratory process, coordinating with other safety and health organizations and teams at the Center, and issuing an SOP binder. The Chemical Hygiene Policy was first established for the Center. The Chemical Hygiene Plan was established and reviewed by technical, laboratory and management for viability and applicability to the Center. A risk assessment was conducted for each laboratory. The laboratories were prioritized by order of risk, higher risk taking priority. A Chemical Management Team staff member interviewed the lead researcher for each laboratory process to gather the information needed to develop the SOP for the process. A binder containing the Chemical Hygiene Plan, the SOP, a map of the laboratory identifying the personal protective equipment and best egress, and glove guides, as well as other guides for safety and health. Each laboratory process has been captured in the form of an SOP. The chemicals used in the procedure have been identified and the information is used to reduce the number of chemicals in the lab. The Chemical Hygiene Plan binder is used as a training tool for new employees. LeRC is in compliance with the OSHA Standard. The program was designed to comply with the OSHA standard. In the process, we have been able to assess the usage of chemicals in the laboratories, as well as reduce or relocate the chemicals being stored in the laboratory. Our researchers are trained on the hazards of the materials they work with and have a better understanding of the hazards of the process and what is needed to prevent any incident. From the SOP process, we have been able to reduce our chemical inventory, determine and implement better hygiene procedures and equipment in the laboratories, and provide specific training to our employees. As a result of this program, we are adding labeling to the laboratories for emergency responders and initiating a certified chemical user program.

Derived from text

*Hazardous Materials; Safety Management; Industrial Safety; Hygiene; Laboratories*

19990041005 Bionetics Corp., Cocoa Beach, FL USA

**The Effectiveness of an On-site Musculoskeletal Rehabilitation Program at the Kennedy Space Center**

Nason, Erik T., Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 166-169; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

This study gathered data using the employees that were treated at the Kennedy Space Center (KSC) RehabWorks program between July 1, 1997 and June 30, 1998. The study showed the time lapses between: 1) the patient's date of injury and the first doctor's visit; 2) first doctor's visit and first RehabWorks appointment; and 3) first RehabWorks visit and the discharge date. Also delineated were the most common body part injured, the most common injury type and the total number of visits. All results were differentiated between worker's compensation patients and non-worker's compensation patients. Analysis of the data reflected the effectiveness of the onsite musculoskeletal rehabilitation program known as RehabWorks.

Author

*Injuries; Musculoskeletal System; Effectiveness; Physical Exercise*

19990041009 Edgerton, Germeshausen and Grier, Inc., Cocoa Beach, FL USA

**Evaluation of Cardiovascular Screening Retest for High Risk Employees: Update**

Roth, Carol A., Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 182-185; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Kennedy Space Center (KSC) Health Education and Wellness Program, initiated in 1984, is open to all employees at KSC and Cape Canaveral Air Station (CCAS) at no charge. The goals of the program are to make employees more aware of their health and to screen for early detection of health problems. These are achieved through training classes, worksite lectures, health screenings, informational health packets, individual counseling, pamphlets and videotapes. Prevention is the focus of the program. It is based on four principles: (1) Educate employees about their bodies and healthy lifestyles; (2) Help employees identify present problems and risks factors for potential problems; (3) Assist employees in the reduction or elimination of risk factors; and (4) Support employees in maintaining their healthy lifestyle through monitoring and evaluation. Every month a different health program is featured on a wide variety of topics.

Derived from text

*Cardiovascular System; Health; Education; Risk; NASA Programs; Physiological Tests*

19990041013 NASA Kennedy Space Center, Cocoa Beach, FL USA

**Kennedy Space Center Coronary Heart Disease Risk Screening Program**

Tipton, David A., NASA Kennedy Space Center, USA; Scarpa, Philip J., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 195-199; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Coronary heart disease (CHD) is the number one cause of death in the U.S. It is a likely cause of death and disability in the lives of employees at Kennedy Space Center (KSC) as well. The KSC Biomedical Office used a multifactorial formula developed by the Framingham Heart Study to calculate CHD risk probabilities for individuals in a segment of the KSC population who require medical evaluation for job certification. Those individuals assessed to have a high risk probability will be targeted for intervention.

Derived from text

*Coronary Artery Disease; Risk; Personnel*

19990041014 NASA Johnson Space Center, Houston, TX USA

**Monitoring and Modeling Astronaut Occupational Radiation Exposures in Space: Recent Advances**

Weyland, Mark, Lockheed Martin Corp., USA; Golightly, Michael, NASA Johnson Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 200; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche; Abstract Only; Abstract Only

In 1982 astronauts were declared to be radiation workers by OSHA, and as such were subject to the rules and regulations applied to that group. NASA was already aware that space radiation was a hazard to crewmembers and had been studying and monitoring astronaut doses since 1962 at the Johnson Space Center. It was quickly realized NASA would not be able to accomplish all of its goals if the astronauts were subject to the ground based radiation worker limits, and thus received a waiver from OSHA to establish independent limits. As part of the stipulation attached to setting new limits, OSHA included a requirement to perform preflight dose projections for each crew and inform them of the associated risks. Additional requirements included measuring

doses from various sources during the flight, making every effort to prevent a crewmember from exceeding the new limits, and keeping all exposures As Low As Reasonably Achievable (a.k.a. ALARA - a common health physics principle). The assembly of the International Space Station (ISS) and its initial manned operations will coincide with the 4-5 year period of high space weather activity at the next maximum in the solar cycle. For the first time in NASA's manned program, US astronauts will be in orbit continuously throughout a solar maximum period. During this period, crews are at risk of significantly increased radiation exposures due to solar particle events and trapped electron belt enhancements following geomagnetic storms. The problem of protecting crews is compounded by the difficulty of providing continuous real-time monitoring over a period of a decade in an era of tightly constrained budgets. In order to prepare for ISS radiological support needs, the NASA Space Radiation Analysis Group and the NOAA Space Environment Center have undertaken a multiyear effort to improve and automate ground-based space weather monitoring systems and real-time radiation analysis tools. These improvements include a coupled, automated space weather monitoring and alarm system--SPE exposure analysis system, an advanced space weather data distribution and display system, and a high-fidelity space weather simulation system. In addition, significant new real-time space weather data sets, which will enhance the forecasting and now-casting of near-Earth space environment conditions, are being made available through unique NASA-NOAA-USAF collaborations. These new data sets include coronal mass ejection monitoring by the Solar and Heliospheric Observatory (SOHO) and in-situ plasma and particle monitoring at the L1 libration point by the Solar Wind Monitor (SWIM) and Advanced Composition Explorer (ACE) spacecraft. Advanced real-time radiation monitoring data from charged particle telescopes and tissue equivalent proportional counters will also be available to assist crew and flight controllers in monitoring the external and intravehicular radiation environment.

Author

*Aerospace Environments; Solar Activity Effects; Radiation Dosage; Radiation Hazards; Solar Radiation*

19990041017 Florida State Univ., Center for Biomedical and Toxicological Research, Gainesville, FL USA

**Toxicology & Health-Based Risk Assessment: Applications in the Workplace**

Teaf, Christopher M., Florida State Univ., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 208-210; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Although the term may not be universally familiar, "risk assessment" is practiced on a regular basis in the workplace, both in consideration of chemical and physical hazards. Occupational guidelines or standards, as promulgated by organizations such as OSHA or ACGIH, represent a fundamental form of risk assessment which defines the levels of acceptable exposure under assumptions of regular worker exposure. More specific forms of risk assessment are based upon specific "exposure estimation" that seeks to carefully define the actual duration and magnitude of exposure to an individual under a particular set of conditions. Exposure details will determine the estimate of intake, or absorption, and hence the associated potential health risk. Simply put, the mere presence of a chemical in the environment does not necessarily indicate that harm will occur. That determination can only be made on the basis of the case-specific exposure characterization.

Derived from text

*Toxicology; Risk; Toxic Hazards; Exposure*

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### BEHAVIORAL SCIENCES

*Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.*

19990039548 Army Aeromedical Research Lab., Fort Rucker, AL USA

**Evaluation of a Standardized Spatial Disorientation Flight Profile**

Feb. 1999; 20p; In English

Report No.(s): AD-A361470; USAARL-99-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study was designed to examine the feasibility of using visual-vestibular mismatch software to produce disorienting events in flight within a standardized simulator flight profile. Data were examined in order to ensure that collection of standard flight performance measures was not interrupted by the addition of disorienting events. Twenty-one UH-60 qualified Army aviators flew a 1-hour UH-60 simulator flight profile containing three visual-vestibular mismatch events (visual and vestibular divergence used, 4 degrees per sec with pitch, 6 degrees per sec with roll, and 8 degrees per sec with drift). Following the flight, aviators filled out a simulator sickness questionnaire and rated each event in terms of difficulty of aircraft control recovery.

DTIC

*Flight Characteristics; Aircraft Control; Disorientation; Motion Sickness*

## MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

*Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.*

19990039553 Biodynamic Research Corp., San Antonio, TX USA

**A PC-Based Head-Spine Model, HSM-PC**

Jan. 1999; 29p; In English

Report No.(s): AD-A361392; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Head Spine Model (HSM) was originally developed by the USAF Aeromedical Research Laboratory during the late seventies. The HSM was created to aid the solution of problems related to spinal loads resulting from ejection seat acceleration. Unfortunately, the original researchers who developed and used the HSM left the Government and the original code has not been maintained or used in research for several years. Biodynamic Research Corporation contracted with the USAF to create a computer model of the dynamic response of the human head and spine that executes on a PC compatible computer under a Windows environment. The HSM-PC is aimed at creating simulations of the biomechanical responses of the head and spine to potentially traumatic impulsive acceleration and impact events.

DTIC

*Computerized Simulation; Spinal Cord; Head (Anatomy)*

19990039571 Department of Energy, Assistant Secretary for Management and Administration, Washington, DC USA

**Reusability study with organic vapor air-purifying respirator cartridges**

Wood, G. O., Department of Energy, USA; Kissane, R., Department of Energy, USA; Nov. 30, 1997; 8p; In English; Chemical and Biological Defense Research, 1997, USA; Sponsored by Army Edgewood Arsenal, USA

Report No.(s): DE98-002926; LA-UR-97-4458; No Copyright; Avail: Department of Energy Information Bridge, Microfiche

The question often arises about the reusability of organic vapor adsorption beds, such as air-purifying respirator cartridges, after periods of storage without use (airflow). The extremes of practice are: (1) use once and discard or (2) reuse multiple times assuming the protection is still afforded. The goal is to develop data and a model to provide guidance to decide when reuse is acceptable. They have studied the loss of protection of a commercial organic vapor cartridge after storage for varying periods of time. Three vapors (ethyl acetate, methylene chloride, and hexane) were individually loaded onto test cartridges using a breathing pump. Extents of loading, times of loading, and vapor concentrations were varied. After selected periods of storage the cartridges were again challenged with the same vapor concentration. The increases in concentration of a vapor in the effluent air (simulated breaths) from a cartridge immediately upon reuse depended on the storage period, the extent of loading during initial use, the volatility of the vapor, and the water vapor adsorbed, but not much on the vapor concentration.

NTIS

*Respirators; Service Life; Water Vapor; Organic Materials; Purification; Cartridges; Adsorption*

19990040183 Biodynamic Research Corp., San Antonio, TX USA

**A Personal Computer-Based Head-Spine Model *Final Report, May 1996 - Sep. 1998***

Pancratz, David J.; Rogers, Linda J.; Bomar, John B., Jr; Sep. 1998; 139p; In English

Report No.(s): AD-A361188; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Biodynamic Research Corporation (BRC) of San Antonio, TX, completed an SBIR Phase II project to port the Air Force's Head-Spine Model (HSM) to a personal computer environment, improve certain features of the software, and add a user-friendly interface. The impetus for this project was the Air Force's desire to have a software tool capable of modeling the internal forces and motions of the human head and spine during impulsive acceleration events, particularly aircraft ejections. Although models exist to predict the gross motion of a human under acceleration loading, such as the Air Force Articulated Total Body (ATB) model, Dynamman, and MADYMO, the Head-Spine Model is the only tool able to provide estimates of internal forces. For this reason, the HSM could be valuable to the Air Force and other scientists for simulating acceleration environments.

DTIC

*Human-Computer Interface; Head (Anatomy); Biodynamics; Computer Techniques; Spinal Cord*

19990040218 Army Research Lab., Human Research and Engineering Directorate, Aberdeen Proving Ground, MD USA  
Aviator Behavior and Performance as Affected by Aircrew Life Support and Protective Equipment  
Waugh, John D.; Fatkin, Linda T.; Patton, Debra J.; Mullins, Linda L.; Burton, Pamela A.; Mar. 1999; 110p; In English; Original contains color plates

Contract(s)/Grant(s): Proj-1L161110274A

Report No.(s): AD-A361321; ARL-MR-440; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A methodology for quantifying Army rotary wing aviator performance as influenced by aircrew life support, survival, and nuclear-biological-chemical clothing and equipment ensembles was examined in a set of experimental trials conducted in an AH-64 (Apache) combat mission simulator. The methodology was based on an aircrew evaluation procedure originally developed for use in the crew coordination training of all Army aviators. It uses a set of 13 basic qualities, each with behavioral anchors and a 7-point rating scale, and it is administered by specifically trained senior aviator evaluators. Ten crews, two aviators in each, while fully encumbered, performed three combat missions for record, representative of typical operational tasks, with one "variation" trial conducted without the over-water components of the ensemble. Measures of effectiveness and flight data, as well as stress assessment and equipment "complaints" citations, were recorded. The results indicated that the behavior-anchored scores were not sensitive enough to statistically discriminate among the independent variables of repeated measures and the variation trials even though graphically, differences were readily apparent. Attempts to apply transformations to the data, based on the aviator subjects' relative flying experience and their apparent accommodation to the trials were also statistically unsuccessful. The additional measures collected did not yield statistically significant discriminations nor did they correlate well with the evaluation score. A number of options for improving the technique are offered.

DTIC

*Protective Clothing; Aircraft Pilots*

19990040400 Armstrong Lab., Aerospace Medicine Directorate, Brooks AFB, TX USA  
Testing and Evaluation of the Modified Gentex Mask Assembly in the Hyperbaric Environment *Final Report, Feb. 1996 - Apr. 1997*

Massa, Thomas V.; Apr. 1998; 20p; In English

Report No.(s): AD-A361226; AL-AO-BR-TR-1998-0038; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Since the late 1970's Air Force hyperbaric facilities have been utilizing the MBU 5/P aviator's mask with a unique hyperbaric adapter assembly as a way to safely exhaust exhaled breathing gas from inside a high pressure chamber to ground level ambient pressure. Although the MBU 5/P mask, developed in the 1950's, is still available through depot, the modified adapter assembly is not. In order to purchase additional units, the adapter assembly must be re-milled at considerable expense to the government. Recently developed mask technology has evolved new systems which may provide increased comfort and reduced maintenance at less cost to the government. The Modified Gentex Mask Assembly (MGMA) was evaluated by hyperbaric technologists at 3.0, 2.4 and 2.0 ATA using a pressure demand regulator, pressure transducers and a mass spectrometer to determine if the MGMA could physiologically maintain levels of inspired oxygen while also exhausting expired carbon dioxide and other exhaled gases to ambient pressure. Equipment testing has identified the MGMA as a suitable substitute for implementation at Air Force and possibly civilian hyperbaric facilities. Inspiratory and expiratory gas analysis indicate the MGMA and current A-14 regulator constitute a highly efficient oxygen delivery system for hyperbaric use. MGMA met or exceeded industry standards established by Sheffield, Stork and Morgan. Currently, the MGMA is being modified for improvements by the Gentex Corporation.

DTIC

*Oxygen Masks; Oxygen Supply Equipment; Aircraft Pilots; Breathing Apparatus; Gas Mixtures*

19990040660 NASA Marshall Space Flight Center, Huntsville, AL USA

Human Factors Engineering at Marshall Space Flight Center

Dunn, M. C., NASA Marshall Space Flight Center, USA; Hutchinson, Sonya L., NASA Marshall Space Flight Center, USA; 1999; 8p; In English; 25th, 24-28 Mar. 1999, Kansas City, MO, USA; Sponsored by California State Univ., USA; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The mission of NASA Marshall Space Flight Center (MSFC) is to develop, implement, and maintain systems for space transportation and microgravity research. Factors impacting the MSFC position as a leader in advancing science and technology include: (1) heightened emphasis on safety; (2) increased interest in effective resource utilization; and (3) growing importance of employing systems and procedures that pragmatically support mission science. In light of these factors, MSFC is integrating

human factors engineering (HFE) into the systems engineering process. This paper describes the HFE program, applications of HFE in MSFC projects, and the future of HFE at MSFC.

Author

*Human Factors Engineering; Product Development; Research and Development; Microgravity; Safety*

19990040859 NASA Marshall Space Flight Center, Huntsville, AL USA

**Using Virtual Simulations in the Design of 21st Century Space Science Environments**

Hutchinson, Sonya L., NASA Marshall Space Flight Center, USA; Alves, Jeffery R., Sigmatech, Inc., USA; 1996; 8p; In English; Technical Professional Conference, 24-28 Mar. 1999, Kansas City, MO, USA; Sponsored by California State Univ., USA; Original contains color illustrations; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Space Technology has been rapidly increasing in the past decade. This can be attributed to the future construction of the International Space Station (ISS). New innovations must constantly be engineered to make ISS the safest, quality, research facility in space. Since space science must often be gathered by crew members, more attention must be geared to the human's safety and comfort. Virtual simulations are now being used to design environments that crew members can live in for long periods of time without harmful effects to their bodies. This paper gives a few examples of the ergonomic design problems that arise on manned space flights, and design solutions that follow NASA's strategic commitment to customer satisfaction. The conclusions show that virtual simulations are a great asset to 21st century design.

Author

*Simulation; Safety; International Space Station; Comfort; Aerospace Engineering*

19990040910 Defence Science and Technology Organisation, Combatant Protection and Nutrition Branch, Melbourne, Australia  
**A Methodology for Measuring the Physiological Strain of Enhanced Soldiers: The 1998 Soldier Combat System Enhancement Study**

Amos, Denys, Defence Science and Technology Organisation, Australia; Cotter, James D., Defence Science and Technology Organisation, Australia; Lau, Wai-Man, Defence Science and Technology Organisation, Australia; Forbes, Christopher H., Defence Science and Technology Organisation, Australia; November 1998; In English; Original contains color illustrations  
Report No.(s): DSTO-TR-0747; DODA-AR-010-678; Copyright; Avail: Issuing Activity (DSTO Aeronautical and Maritime Research Lab., PO Box 4331, Melbourne, Victoria 3001, Australia), Hardcopy, Microfiche

The prime objective of the 1998 Soldier Combat System Enhancement Study was to assess, develop and verify methods to evaluate the physiological performance of dismounted soldiers with basic or enhanced capabilities conducting routine operations in the tropics. Core temperature, mean skin temperature and heart rate are appropriate measures for evaluating the physiological burden of soldier combat system enhancements. Current techniques for measuring mean skin temperature and heart rates are adequate. The measurement of core temperature using rectal thermistors has significant limitations, especially during vigorous activities. Studies of the hydration status of soldiers can be conducted using relatively straightforward methods to determine water intake, weight loss, urine production, and total sweat rate by weight differences. For field studies of hydration, there may be no need to analyse urine for sodium; specific gravity is more easily measured and appears to provide adequate information on hydration status. The robustness of the Metamax used for VO<sub>2</sub> measurements was demonstrated and provided real time measurements of oxygen consumption, and of metabolic stress associated with activities.

Author

*Body Temperature; Combat; Heart Rate; Physiology; Skin Temperature (Biology); Temperature Measurement; Time Measurement; Procedures*

19990040938 Institute for Human Factors TNO, Soesterberg, Netherlands

**Asymmetrical Tracking Accuracy in Three Translational Degrees of Freedom *Final Report Asymmetrische Tracking Prestatie bij drie Translatoire Vrijheidsgraden***

vanErp, J. B. F., Institute for Human Factors TNO, Netherlands; Oving, A. B., Institute for Human Factors TNO, Netherlands; Jan. 23, 1998; 35p; In English

Contract(s)/Grant(s): B97-031; Proj. 788.1

Report No.(s): TD98-0009; TM-98-8002; Copyright; Avail: Issuing Activity (TNO Human Factors Research Inst., Kampweg 5, 3769 De Soesterberg, The Netherlands), Hardcopy, Microfiche

Recent developments in the domain of 3D visualization ask for control devices with three or more degrees of freedom. Applications can be encountered within CAD/CAM applications, virtual environments, computer games, but also within the remote control of devices and platforms. To integrate two or more degrees of freedom (for example, three translational degrees of freedom) has some potential advantages. The question, however, is how accurate operators can control the different degrees

of freedom with such an integrated device. Former experiments report tracking errors in the depth dimension which are up to 4 times larger than on the other two dimensions. The cause for this may be found in two systems. First, it might be found in the visual system, in which the missing depth cues result in performance degradation. Second, it might be found in the motor system because not all axes may be controlled with the same accuracy. Usually, not much attention is given to the motor component. Sometimes, even a description of the specific coupling between motor and visual dimension lacks. Earlier in the present research project, it was claimed that two compatible control-display mappings exist for the translational degrees of freedom in 3D: spatial-motion mapping, and reference-frame mapping. In the former, motions of device and object are always parallel in 3D, in the latter motions of device and object are always equal in respect to their respective reference planes, which are differently orientated in common situations (for example, a table with a mouse and a monitor). Both mappings lead to the coupling of a different motor component to the depth dimension of the display: up-down and forward- backward, respectively. Both mappings are tested with a pursuit and compensatory task, which enables the separation of the visual and the motor component. Besides this, the effects of additional visual depth cues is investigated. The results show that in the present experiment the visual component causes by far the largest part of the effects. The tracking error in the visual depth dimension is about four times larger than those on the other dimensions. The effect of the motor component is less, it causes a 10 percent enlarged tracking error in the up-down axis, but it is consistent over different couplings with the visual dimension. Providing additional visual depth cues in the display leads to a decrease of the tracking error on the visual depth dimension. However, no stereoscopic views were provided, while this may be the strongest depth cue. There are no differences between the pursuit and compensatory tracking task, which may be due to the more experience when executing the latter task.

Author

*Asymmetry; Accuracy; Degrees of Freedom; Three Dimensional Models; Visual Stimuli; Pursuit Tracking*

19990040981 NASA Johnson Space Center, Houston, TX USA

**Medical Aspects of Space Walking**

Musgrave, Story, NASA Johnson Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 92-93; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Dr. Musgrave has acquired extensive experience during a distinguished and impressive career that includes flying as an astronaut on six Shuttle missions, participating in many hours of extravehicular activity, and contributing his myriad talents toward great public service, especially in the area of education. He has a unique perspective as a physician, scientist, engineer, pilot, and scholar. His interests and breadth of knowledge, which astound even the seasoned space enthusiast, have provided the space program an extraordinary scientific and technical expertise. Dr. Musgrave presented a personal perspective on space flight with particular emphasis on extravehicular activity (EVA or space walking), which was copiously illustrated with photographs from many space missions. His theme was two fold: the exacting and detailed preparations required for successful execution of a mission plan and a cosmic view of mankind's place in the greater scheme of things.

Derived from text

*Astronauts; Extravehicular Activity; Medical Phenomena; Space Maintenance*

19990040997 Edgerton, Germeshausen and Grier, Inc., Cocoa Beach, FL USA

**A Follow-up Study of Ergonomic Evaluations Performed at KSC/CCAS in 1997**

Geyer, Bart, Edgerton, Germeshausen and Grier, Inc., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 144-147; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

As awareness concerning ergonomics has increased, injuries resulting from ergonomic hazards are becoming more recognized in the Kennedy Space Center (KSC) and Cape Canaveral Air Station (CCAS) workplace. This increased awareness has led to greater numbers of KSC/CCAS personnel reporting to KSC medical facilities with symptoms related to ergonomic problems in their workplace. In response to these medical visits, the Base Operations Contractor (BOC, EG&G Florida Inc.) Industrial Hygiene (IH) Office initiates an ergonomic evaluation of the patient's workplace. In the 1997 calendar year, the EG&G IH Office completed 72 ergonomic workplace evaluations. Following these evaluations, recommendations were provided to the employee on how to minimize or eliminate ergonomic hazards at their workplace. For this study, a follow-up evaluation was performed on the 72 personnel evaluated in 1997. The follow-up entailed: (1) determining if improvements had been implemented to alleviate or correct the identified ergonomics hazards(s); (2) determining if those improvements were effective; and (3) identifying various trends in the implementation of the recommendations provided at the completion of the evaluations. The objective of this study



was to aid the BOC IH Office in developing a focused ergonomic program management plan and associated program implementation strategies, which would reduce the number of ergonomic injuries and minimize ergonomic hazards at KSC and CCAS.

Derived from text

*Human Factors Engineering; Industrial Safety; Workstations*

**19990041002** Bionetics Corp., Cocoa Beach, FL USA

#### **A Comparison of the Effects of Various Exercise Programs on the Reduction of Body Fat**

Mathews, Cristy L., Bionetics Corp., USA; Symons, Chris A., Bionetics Corp., USA; Arnold, Arthur A., Bionetics Corp., USA; Woodard, Daniel, Bionetics Corp., USA; Merz, Marion P., Bionetics Corp., USA; Deppensmith, Barbara, Bionetics Corp., USA; Ghiotto, Deborah, Bionetics Corp., USA; DiBiase, Cathy, Bionetics Corp., USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 159-163; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The interrelationships that exist between exercise and reduction of body fat have been well established. A number of studies have reported that people who exercise have a reduction in body fat. One of the studies by Ballor & Keeseey was a meta-analysis of 53 studies that looked at exercise induced changes in body composition. This study looked at aerobic exercise (walk/run & bike) and weight training and found that all forms of exercise reduced body fat. However, much of the research does not compare different types of exercise to the greatest loss of body fat. The following study was conducted to determine the effect of specific fitness programs on body fat. The changes in body fat due to the type of activity allowed inferences to be made regarding the type of exercise program that produces the greater body fat reduction.

Derived from text

*Physical Exercise; Physical Examinations; Body Weight; Fats*

**19990041006** NASA Kennedy Space Center, Cocoa Beach, FL USA

#### **Health Physics Innovations Developed During Cassini for Future Space Applications**

Nickell, Rodney E., Edgerton, Germeshausen and Grier, Inc., USA; Rutherford, Theresa M., Edgerton, Germeshausen and Grier, Inc., USA; Marmaro, George M., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 170-177; In English; See also 19990040967; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The long history of space flight includes missions that used Space Nuclear Auxiliary Power devices, starting with the Transit 4A Spacecraft (1961), continuing through the Apollo, Pioneer, Viking, Voyager, Galileo, Ulysses, Mars Pathfinder, and most recently, Cassini (1997). All Major Radiological Source (MRS) missions were processed at Kennedy Space Center/Cape Canaveral Air Station (KSC/CCAS) Launch Site in full compliance with program and regulatory requirements. The cumulative experience gained supporting these past missions has led to significant innovations which will be useful for benchmarking future MRS mission ground processing. Innovations developed during ground support for the Cassini mission include official declaration of sealed-source classifications, utilization of a mobile analytical laboratory, employment of a computerized dosimetry record management system, and cross-utilization of personnel from related disciplines.

Author

*Cassini Mission; Health Physics; Radiation Dosage; Nuclear Auxiliary Power Units; Safety Management*

**19990041010** NASA Kennedy Space Center, Cocoa Beach, FL USA

#### **The Need to Reevaluate Nonresponding Ergonomic Patients**

Scarpa, Philip J., NASA Kennedy Space Center, USA; Field, Steven A., NASA Kennedy Space Center, USA; Proceedings from the 1998 Occupational Health Conference: Benchmarking for Excellence; February 1999, pp. 186-187; In English; See also 19990040967; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The Kennedy Space Center (KSC) Environmental Health (EH) contractor performs ergonomic evaluations under its Ergonomic Program. Any KSC employee may request one or the reviewing physician may request one for a patient during a visit to an onsite medical facility. As part of the ergonomic evaluation, recommendations are given to the patient to help reduce any ergonomic problems they experience. The recommendations, if implemented, are successful in the majority of KSC patients; however, a group of patients do not seem to improve. Those who don't improve may be identified by reevaluations, which are performed to implement maximum resolution of ergonomic problems.

Derived from text

*Human Factors Engineering; Health; Injuries; Medical Services*

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